

## CLAIMS:

1. A magnetoresistive memory device (30) comprising an array (20) of magnetoresistive memory elements (10) and at least one magnetic field sensor element (32), wherein the magnetoresistive memory device (30) comprises a partial or non-homogeneous shielding means (33; 40, 41) so as to shield the array (20) of magnetoresistive memory elements (10) differently from an external magnetic field than the at least one magnetic field sensor element (32), there being a shielding difference of at least 5%.
2. A magnetoresistive memory device (30) according to claim 1, wherein the at least one magnetic field sensor element (32) is shielded with first shielding means (40) having a first magnetic field reduction ratio, and the array (20) of magnetoresistive memory elements (10) is provided with second shielding means (41) having a second magnetic field reduction ratio, the second magnetic field reduction ratio being smaller than the first magnetic field reduction ratio.
- 15 3. A magnetoresistive memory device (30) according to claim 2, wherein the first magnetic field reduction ratio is 1:1.
4. A magnetoresistive memory device (30) according to claim 1, wherein the array (20) of magnetoresistive memory elements (10) and the at least one magnetic field sensor element (32) are integrated monolithically on a single chip.
- 20 5. A magnetoresistive memory device (30) according to claim 1, wherein the array (20) of magnetoresistive memory elements (10) and the at least one magnetic field sensor element (32) are located on separate dies in a single package.
- 25 6. A magnetoresistive memory device (30) according to claim 1, wherein the array (20) of magnetoresistive memory elements (10) and the at least one magnetic field sensor element (32) are located on separate dies in separate packages.

7. A method for measuring an external magnetic field present at an array (20) of magnetoresistive memory elements (10), comprising
  - shielding a magnetic field sensor element (32) with a first shielding means (40) having a first magnetic field reduction ratio,
  - shielding the array (20) of magnetoresistive memory elements (10) with a second shielding means (41) having a second magnetic field reduction ratio,
  - there being a shielding difference of at least 5% between the first and the second magnetic field reduction ratio, and
  - determining the external magnetic field value at the array (20) of magnetoresistive memory elements (10) based on the knowledge of the first and second magnetic field reduction ratio.
8. A method according to claim 7, wherein the second magnetic field reduction ratio is smaller than the first magnetic field reduction ratio.
- 15 9. A method according to claim 7, wherein a relationship between the first and second magnetic field reduction ratio is constant for an external magnetic field range.